Competency 1.6 **Emergency Management personnel shall demonstrate a working level knowledge of the concepts associated with environmental protection, transport and diffusion.**

1. Supporting Knowledge and Skills

a. Discuss windspeed, wind direction, and stability as related to emergency assessment and response.

b. Describe the concepts of concentration and deposition and their relationship to emergency planning and response.

c. Define the terms ground water, surface water, and aquifer and discuss transport and diffusion in these media in the context of emergency planning and response.

d. Discuss the concepts of ecosystem and habitat in the context of environmental protection as part of emergency planning and response.

e. Describe the role of consequence assessment process, including the use of modeling techniques and computer codes and the integration of monitoring information.

2. Self-Study Activities (corresponding to the intent of the above competency)

Below are two web sites containing many of the references you may need.

Web Sites		
Organization	**Site Location**	**Notes**
Department of Energy	http://wastenot.inel.gov/cted/stdguido.html	DOE Standards, Guides, and Orders
U.S. House of Representatives	http://law.house.gov/cfr.htm	Searchable Code of Federal Regulations

Read paragraph 11.c(5), pages 10 through 11 of DOE Order 5500.3A.

Read pages 1 through 14 of the DOE Emergency Management Guide *Guidance for Consequence Assessment*.

EXERCISE 1.6-A Define consequence assessment.

EXERCISE 1.6-B Why are meteorological conditions monitored near DOE facilities?

EXERCISE 1.6-C What other environmental conditions are important to consequence assessment?

EXERCISE 1.6-D An emergency is declared. What are the steps taken during the consequence assessment process?

EXERCISE 1.6-E What is meant by continuous consequence assessment? When does it occur?

EXERCISE 1.6-F In general, by what methods is a timely initial assessment of consequences performed?

3. Summary

Consequence assessment is the evaluation and interpretation of radiological or other hazardous materials measurements, or other information to provide a basis for decision making. DOE Order 5500.3A, paragraph 11.c(5), provides information on provisions required for consequence assessment. The DOE Order states in general terms that provisions must adequately assess actual or potential on-site and off-site consequences of an emergency. Refer to the Emergency Management Guide for further assistance.

4. Exercise Solutions

EXERCISE 1.6-A Define consequence assessment.

ANSWER 1.6-A Consequence assessment evaluates and interprets radiological or other hazardous materials measurements or other information to provide a basis for decision making.

EXERCISE 1.6-B Why are meteorological conditions monitored near DOE facilities?

ANSWER 1.6-B Characterization of atmospheric transport and diffusion conditions (e.g., wind speed, wind direction, and stability) in the vicinity of DOE facilities is essential for consequence assessments of airborne releases of hazardous materials. The airborne release pathway typically represents the most time-urgent situation, requiring a rapid, coordinated response.

EXERCISE 1.6-C What other environmental conditions are important to consequence assessment?

ANSWER 1.6-C Aquatic pathways are also monitored.

EXERCISE 1.6-D An emergency is declared. What are the steps taken during the consequence assessment process?

ANSWER 1.6-D

Steps Taken During the Consequence Assessment Process	
Step	**Action**
---	Following initial classification and emergency declaration . . .
1	The emergency organization, facilities, and resources are activated.
2	The initial consequence assessment is refined by available data reflecting current facility status. (The data quantify actual or potential impacts on people and the environment.)
3	The quantitative results are compared to the emergency actions levels (EALs).
4	The emergency class is revised as appropriate.
5	Appropriate on-site protective actions and off-site recommendations are made.

EXERCISE 1.6-E What is meant by continuous consequence assessment? When does it occur?

ANSWER 1.6-E Following a timely initial consequence assessment, additional information on a hazardous release will be received for updating consequence assessment calculations. Resulting continuous consequence assessment activities become an active process, and there is no set time period between iterations. The process is repeated when new or changed information is available.

EXERCISE 1.6-F In general, by what methods is a timely initial assessment of consequences performed?

ANSWER 1.6-F There are several methods:

- Calculational models using automated data on release pathways and environmental transport and diffusion
- Simple calculational models such as graphs, nomograms, or worksheets
- Precalculated consequences for hazards and release magnitudes